Creation of the River Forecast Centers

It was the aforementioned advances (see overview and background sections) which contributed to the National Weather Service decision in 1946 to "centralize" its hydrologic expertise by drainage areas with the establishment of the first two River Forecast Centers; Cincinnati, Ohio and Kansas City, Missouri. Over a 33 year period River Forecast Centers were opened, merged and closed, and in the end there were thirteen. A timeline is shown below.

September 1946	Cincinnati RFC opened
September 1946	Kansas City RFC opened
1947	Salt Lake City Water Supply Forecast Unit opened
December 1947	St. Louis RFC opened
December 1947	Tulsa RFC opened
1948	Harrisburg RFC opened
1948	Portland Water Supply Forecast Unit opened
1948	Portland Water Supply Unit becomes Portland RFC
1950	Knoxville RFC opened
September 1955	Hartford RFC opened
October 1955	Augusta RFC opened
1956	Washington, D. C. Forecast Unit opened
1957	Knoxville RFC changed to Forecast Unit opened
1959	Knoxville Forecast Unit closed
September 1961	Fort Worth RFC opened
1962	Pittsburgh Forecast Unit opened
1963	Sacramento RFC opened
January 1966	St. Louis RFC closed, operations merged with Kansas City RFC
Spring 1967	Augusta RFC moves to Atlanta
1967	Pittsburgh Forecast Unit becomes Pittsburgh RFC
1969	Salt Lake City Water Supply Forecast Unit becomes Salt Lake City RFC
1969	Pittsburgh RFC closed
April 1971	Alaska RFC opened
May 1971	Slidell RFC opened
1971	Washington, D. C. Forecast Unit closed, operations merged with Harrisburg RFC
June 1979	Minneapolis RFC opened, Upper Mississippi/Red River of the North operations spun off from Kansas City RFC
1979	Pittsburgh mini-RFC opened
1989 (?)	Pittsburgh mini-RFC closed, operations merged with Cincinnati RFC

The publication, Weather Bureau Topics, Region One, April 1952 had an article commemorating the creation of the first two River Forecast Centers. A copy of the article is shown below.

The First River Forecast Center

The historic conference, September 23, 1946, at which the first RFC was born. Left to right, Henry Rockwood, William E. Hiatt, George R. Marth, Merrill Bernard, Roy E. Lundquist, J. Cecil Alter, Ray K. Linsley, and Max Kohler. Photo by courtesy Cincinnati Times-Star.

ON September 5, 1946, the Central Office announced in the press that the Weather Bureau was going to have twins. The "increase" was to be in the C&HS Division and the two "children" were to be called River Forecast Centers. The first was born at Cincinnati, Ohio on September 23, 1946 during a special conference including Central Office representatives, river district officials from the Ohio River Valley, Regional Engineers and two of the staff of the newly born "Cincinnati RFC" and others. The second twin RFC was born a few weeks later at Kansas City, Missouri.

The inauguration of the River Forecast Center program was the realization of a dream come true, particularly for Merrill Bernard, whose drive and inspiration carried the development through almost insurmountable problems, both technical and organizational.

This program in the Bureau represents the latest and most important forward step in the development of an adequate river and flood forecasting service. The River Forecast Centers are staffed with trained hydrologists who also have a background knowledge of meteorology. All the facilities of the National weather service and the latest hydrologic techniques, many of which were developed by Weather Bureau hydrologists, support these river centers in the preparation of integrated forecasts for the Ohio and Missouri as well as for other drainage basins in the country as the program expands.

The Cincinnati River Forecast Center covers an area of responsibility embracing eight river districts in the Ohio River Valley. The area comprises 136,840 square miles of drainage basin extending for 789 river miles from just below Wheeling, W. Va., to Fords Ferry, Ky., with all

intervening tributaries. In the great Mississippi River system, the Ohio Basin constitutes only 16% of the total drainage area but it contributes 43% of the average annual flow to the Mississippi River. The greatest flood was in January-February, 1937, when approximately 500 million dollars damage occurred.

To be effective, the forecasting program had to be ready to function within the very short period of one year's time. Forecasting procedures were adapted from basic design methods under direction of the Procedure Development Section of the Hydrologic Branch, C&HS Division. New schemes and charts had to be invented to correlate and process the great mass of data and records. The year 1947 produced only a few floods on the tributaries and gave the RFC a chance to work up the procedures in time for the next flood season.

Actual forecasting responsibility was first undertaken in November, 1947, serving the Indianapolis River District. Operations expanded rapidly thereafter. The first Ohio River flood that was to test the new procedures occurred in February, 1948 under complicated conditions of frozen rivers, snow and ice on the watershed, and heavy rain attending a period of rapid melting of snow and ice. The forecasts were accurate and timely but many operational "fences" had to be mended to bring the procedures into better coordination and to speed up the processes.

When the severe flood of April, 1948, developed suddenly, the Cincinnati RFC was ready. This was a major test and the new program worked well in every respect. River stage and crest forecasts were issued in connection with flood warnings with greater accuracy and timeliness than had ever been achieved under similar conditions in the past. The more timely warnings on the main rivers were made possible by forecasting the runoff directly from measured rainfall and compiling crest forecasts well in advance of actual crests on the tributaries. It was not necessary, as in the past, to wait for crests to occur upstream before issuing flood crest estimates downstream. It was generally conceded after the floods were over that the improved forecasting and flood warning service played its part in substantially reducing losses in these two floods. This record has been maintained continuously in several severe floods since the first major tests.

The experience of the Cincinnati River Forecast Center indicates that several important objectives have been achieved: (1) headwater advisory forecasts in advance of rainfall for tributary points were the first of such aids to river districts; (2) forecasting directly from rainfall for each of the 115 unit sub-basins that might be affected provided a method for giving earlier warnings to every point downstream; and (3) a more detailed and extended forecasting service program was attained. This provided better and more complete information for operational needs of various interests in connection with water supply, navigation, reservoir control, emergency protection measures, removal of property, evacuating persons to safety, rerouting of traffic, and the eventual return to normal as the rivers fell to lower stages after the crest.

Possibly one of the most important general advances made in the new RFC program has been the strengthening of the flood warning service independently of personal skill and experience. This has been demonstrated in recent years by a continued high standard of river forecasting service rendered both at the RFC level and the River District level under the impacts of frequent changes in personnel. The river forecaster no longer "takes with him" the know-how gained from long years of experience leaving something of a vacuum to be filled by his successor. Operations are now established in thoroughly tested procedures based on many years of record, and on sound hydrologic principles reflected in standard graphs and formulated forecasting techniques. So the RFC just keeps rolling along with Old Man River, whether it be in low or high water. ■

Storm Warning Service Appreciated

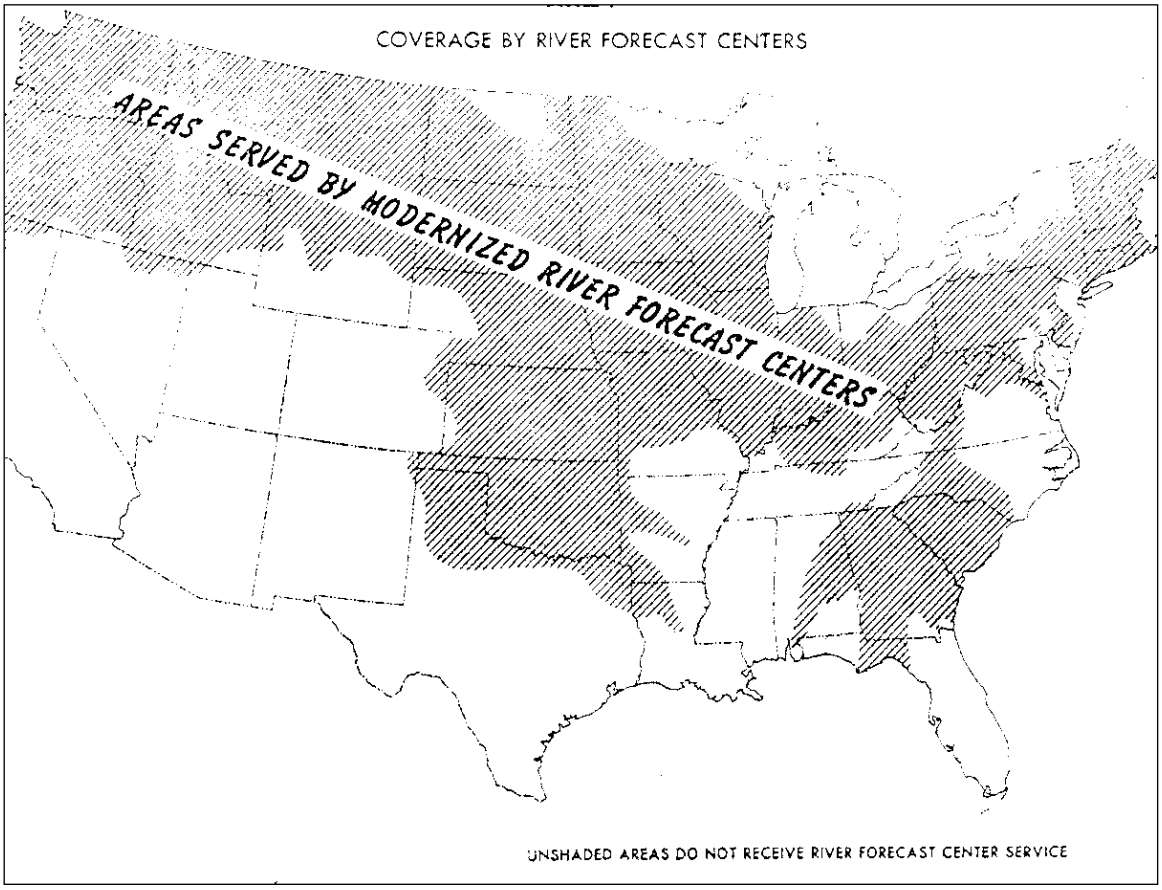
A LETTER of appreciation has been received by WBAS, Wichita, Kansas, from the National Gypsum Company which operates the Kansas Ordnance Plant at Parsons.

The letter reads in part: "We wish to acknowledge and extend to you our appreciation for your storm warning reports. These warnings are certainly helpful to us, inasmuch as we can get our operations in a safe condition before the storms reach this area."

Wichita personnel were active in helping the Ordnance Plant officials establish a severe local storm warning network in the Parsons area. In addition, Wichita has arranged to provide the Ordnance Plant with forecasts of impending local disturbances involving lightning and winds.

Colonel P. N. Wickens, Commander at the Parsons Plant, has also expressed his gratification and personal appreciation for the assistance provided by Meteorologist in Charge Victor Phillips, and his staff at Wichita. ■

By November 1959 about half of the 48 contiguous states were covered by the new river forecast centers as shown in the figure[1] below. The southwest, Texas, and portions of the southeast, as well as the two new states of Hawaii and Alaska, still did not have coverage.



Ten years later there were eleven river forecast centers, there were: Atlanta, GA; Cincinnati, OH; Fort Worth, TX; Harrisburg, PA; Hartford, CT; Kansas City, MO; Portland. OR; Sacramento, CA; Salt Lake City, UT; Tulsa, OK; and Washington, D.C.. River forecast centers St. Louis MO (merged with Kansas City), Knoxville TN, and Pittsburgh PA (merged with Cincinnati) no longer existed and the river forecast center at Augusta, GA was moved to Atlanta, GA. The following figure[2] shows the coverage at the end of 1969. Two years later, in 1971, Slidell and Alaska RFC would be created and all states but Hawaii would be served by a river forecast center. It would not be till 2000 that Hawaii and the other islands of the NWS Pacific Region would officially have river forecast

[1] Figure 7 from the report "River Forecasting and Hydrometeological Analysis" for the Select Committee on National Water Resources United States Senate, November 1959.

[2] This figure from "Daily River Stages, Volume 65, 1969" DOC/NOAA/NWS compiled by National Climatic Center, Environmental Data Service for the Office of Hydrology, Silver Spring, MD 1970.

center services. Also between 1971 and 2000, part of the area of responsibility of the Kansas City RFC would be spun off. This took place in 1979 with the creation of the Minneapolis RFC and in the early 1970s the Washington, D.C. forecast unit was closed and its area of responsibility transferred to the Harrisburg RFC.. There are currently thirteen river forecast centers.